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File: USPT

May 27, 2003

US-PAT-NO: 6570840

DOCUMENT-IDENTIFIER: US 6570840 B1

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TITLE: Figure of merit in optical recording structures

DATE-ISSUED: May 27, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
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APPL-NO: 09/ 558071 [PALM]

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FIELD-OF-SEARCH: 369/275.4

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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| PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
|---|---------------|---------------|------------|
| <input type="checkbox"/> <u>4209804</u> | June 1980 | Dil | 358/128.5 |
| <input type="checkbox"/> <u>4230915</u> | October 1980 | Dil et al. | 179/100.1G |
| <input type="checkbox"/> <u>4270130</u> | May 1981 | Houle et al. | 346/77 |
| <input type="checkbox"/> <u>4306013</u> | December 1981 | Roach et al. | 369/288 |
| <input type="checkbox"/> <u>4308337</u> | December 1981 | Roach et al. | 430/296 |
| <input type="checkbox"/> <u>4359750</u> | November 1982 | Howe | 369/275.4 |

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Detailed Description Text (83):

Through our empirical studies, the following appear to be particularly advantageous: (1) Use of an appropriate ultraviolet (UV) curing resin. According to this method, generally, the optically active surface comprises an acrylic or polyester resin with suitable UV initiators; a dye constituting less than 30% of the resulting mixture, by weight, whose color is complementary to the write laser color (as discussed above); and a suitable solvent--for example, acetone, MEK, toluene, xylene and/or butyl cellosolve--of sufficient quantity to yield a mixture that can readily be spin-coated onto the disc master substrate. Once spin-coated onto the substrate and dried, the surface is exposed to UV light for double the amount of time suggested in the manufacturer's specifications, to yield a surface whose heat threshold for plasticity substantially exceeds its threshold for decomposition. Specifically, the proportions in Example (1), by weight, are:

Diacure SD-17 acrylic oligomer (30%); dye (2%); butyl cellosolve (68%). (2) Use of a catalytically cured resin. In general, a polyurethane or polyester resin, or a combination of both such monomers, is mixed with a dye whose color is complementary to that of the write laser. As in Example (1), the weight of the dye is less than 30% of the total weight of the mixture. A suitable catalyst--e.g., benzoyl peroxide in a quantity less than 1% of total mixture weight--is added. The resulting combination is dissolved in a suitable solvent--see, Examples (1) for a few candidate solvents--and spin-coated onto the substrate. As the surface dries, it cures into an optically active surface whose threshold properties are comparable to those indicated in Example (1). The proportions in Example (2) are: Desmophen R221 polyester resin (73 grams); Desmodur N100 (27 grams); Zinc octoate (0.2 gram); butyl cellosolve (120 grams); dye (10 grams). (3) Use of a thermally cured resin. In general, urethane, melamine and/or phenolic pre-polymer(s) is/are mixed with a dye of suitable color and quantity (see, Examples (1) and (2)). The resulting mixture is dissolved a suitable solvent, selected from the group identified in Example (1), and/or alcohol and/or suitable ester(s), to yield a mixture that can readily be spin-coated onto the substrate. After spin coating is accomplished, the disc master is baked at a temperature range of approximately 150.degree. to 200.degree. C. for approximately 1 1/2 hours. The proportions in Example (3) are: Reichold Beckamine #21-505 (10 grams); dye (1 gram); butyl cellosolve (89 grams).

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